



Best Available Copy

Extraction of DNA from FTATM Blood Stain Collection Cards for Construction of a Large STR National DNA Data Base

Elliott, J.C.¹, Bowen, K.L.¹, Walker, T.², Sauve, V.M.³, and Fourney, R.M.¹

¹DNA Methods and Data Base, Central Forensic Laboratory, Ottawa, Ontario

²Biology Forensic Laboratory Regina, Saskatchewan

³Biology, Forensic Laboratory, Edmonton, Alberta, Forensic Laboratory Services, Royal Canadian Mounted Police

<> <> <> <> <> <> <> <> <> <> <> <> <> <> <> <> <> <> <> <>

Throughout the world many laboratories are evaluating STR DNA technology for the potential construction of criminal offender investigative databases. The success of such an endeavor will require the safe practical collection of biological samples on a stable matrix which facilitates long term presentation of DNA for transportation and archival storage as well as promote rapid efficient DNA extraction and PCR amplification with multiplex STR systems. FTATM paper*, a reagent mix held in a paper matrix was evaluated for blood stain collection and PCR amplification properties using the Profiler II multiplex system (ABD, Foster City) composed of nine STRs and the Amelogenin gender discrimination locus. Dried blood stains were sampled using a 1mm punch (Harris Micro punch, Fitzco) and the STR alleles amplified according to standard ABD AmpF/STRTM conditions as well as the modified amplification protocol using a 25µL final volume and an extension step lengthened to 90 sec. Allele detection and signal peak evaluation was made with a 377 Automated Fluorescent Sequencer (ABD, Foster City). The efficacy of the procedure was assessed using practical empirical characteristics including: allele detection (peak height), detection resolution (single base resolution to baseline), absence of sample or PCR generated artifacts (stutters, peak widening and shoulders and extraneous bands) and sample variability across a dried blood stain. In addition, STR analysis was performed on blood stain samples preserved and stored under a variety of conditions: dried before storage in unsealed bags, dried before storage in sealed mylar pouches containing a desiccant and sealed in the mylar pouch with desiccant while still wet. All conditions and sampling variations essentially yielded excellent results following amplification with the Profiler II multiplex system with allele peak heights typically in the range of 2000-5000 fluorescent units across all systems following a minimum sample load from the amplified product. A limited study was also conducted with saliva samples (spital applied to the matrix) recovered from FTATM paper. DNA amplified directly from the FTATM dried saliva stain (1-2 µL) clearly demonstrated the practical use of this procedure for collection, archival storage and STR analysis.

This study represents an empirical evaluation of the FTATM collection/amplification process for large DNA database applications. Previous preliminary evaluations by our laboratories have shown that FTATM collection and direct STR amplification was easily performed by different individuals who have a wide variety of experience. In addition FTATM results were found comparable to samples processed from normal untreated blood stain collection cards but it was noted that the yield of target DNA and overall amplification efficiency was enhanced over time with little or no degradation evident on FTATM collected materials. Future studies will involve automated processing of FTATM samples and direct amplification using the Profiler II multiplex system.

*US Patent-Solid medium and method for DNA storage, SN: 5,496,562: L.A. Burgoyne

Go to [proceedings home page](#)